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Spalding et al.

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(54) **WEDGE CONNECTOR ASSEMBLIES AND METHODS FOR CONNECTING ELECTRICAL CONDUCTORS USING SAME**

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H01R 4/48	(2006.01)
H01R 43/26	(2006.01)

(52) **U.S. Cl.**

CPC ***H01R 4/489*** (2013.01); ***H01R 43/26*** (2013.01); *Y10T 29/49208* (2015.01)

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See application file for complete search history.

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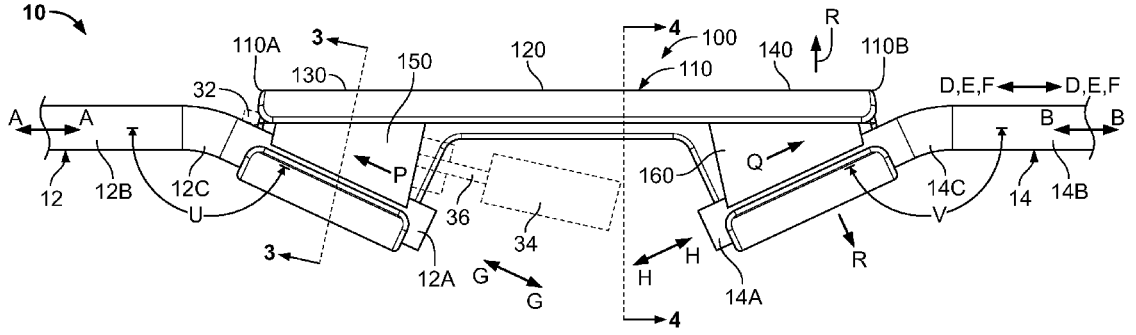
(57) **ABSTRACT**

A wedge connector assembly for forming an electrical connection with first and second electrical conductors includes a coupling portion, first and second resilient spring sleeve portions located on the coupling portion, a first wedge member and a second wedge member. The first spring sleeve portion defines a first sleeve cavity tapering in a first direction away from the second spring sleeve portion and the second spring sleeve portion defines the second sleeve cavity tapering in a second direction away from the first spring sleeve portion. The first wedge member is configured to be forcibly driven into the first sleeve cavity in the first direction to capture the first conductor and the second wedge member is configured to be forcibly driven into the second sleeve cavity in the second direction to thereby capture the second conductor.

21 Claims, 6 Drawing Sheets



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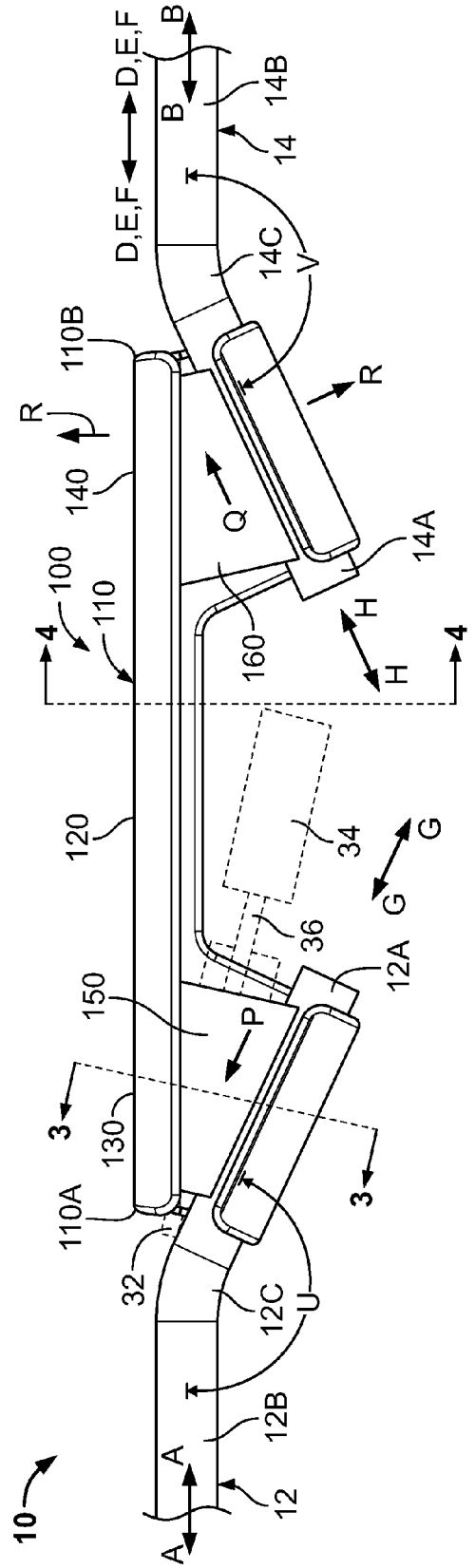

10
12
A
12B
12C
U
32
110A
130
3
150
P
12A
36
34
G
120
140
R
110B
100
4
110
160
14A
H
Q
14C
V
D,E,F
B
14B
14

FIG. 1

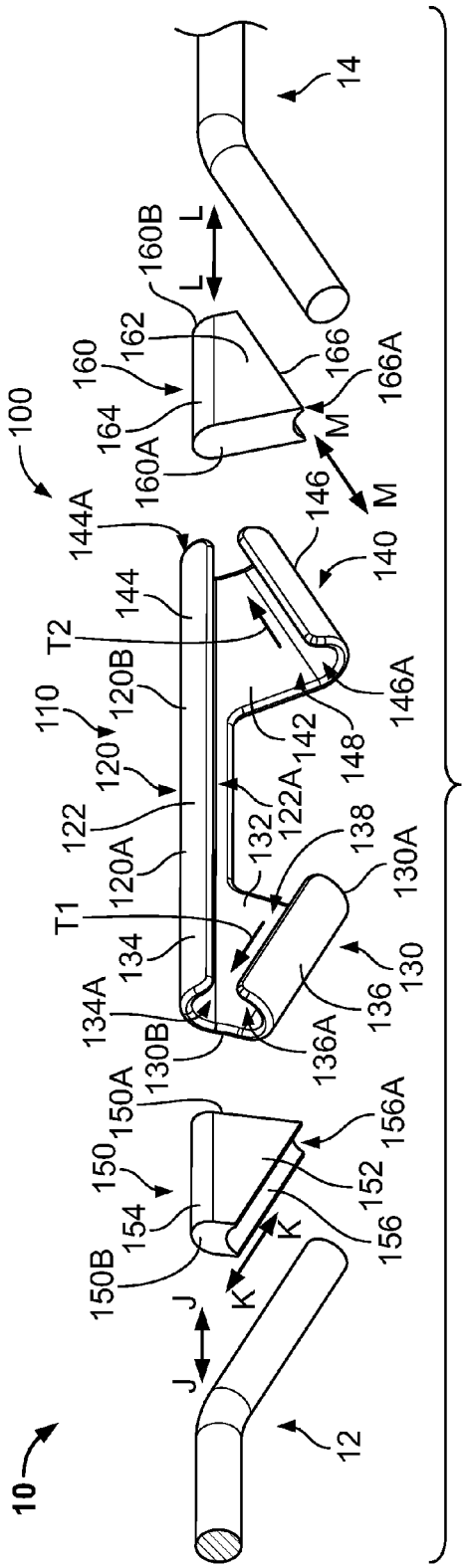

10
12
J
K
150B
154
150
150A
130B
134A
134
T1
120A
122
120
110
120B
T2
144
144A
100
160A
164
160
162
160B
L
166
166A
M
146
140
146A
142
148
122A
132
138
130A
130
136
136A
156
152
156A
14

FIG. 2

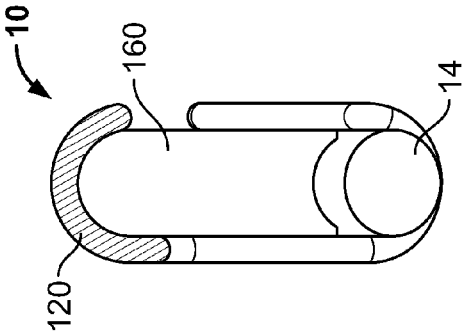


FIG. 4

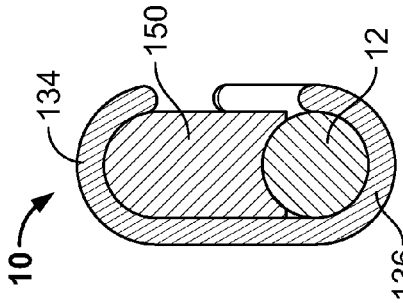


FIG. 3

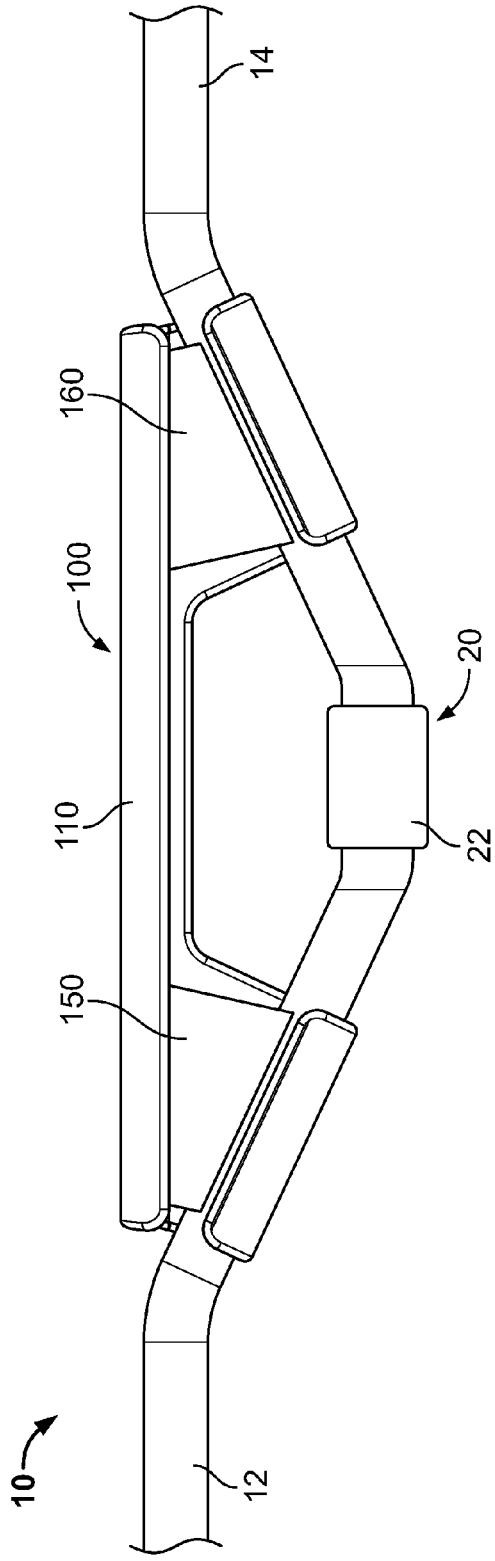


FIG. 5

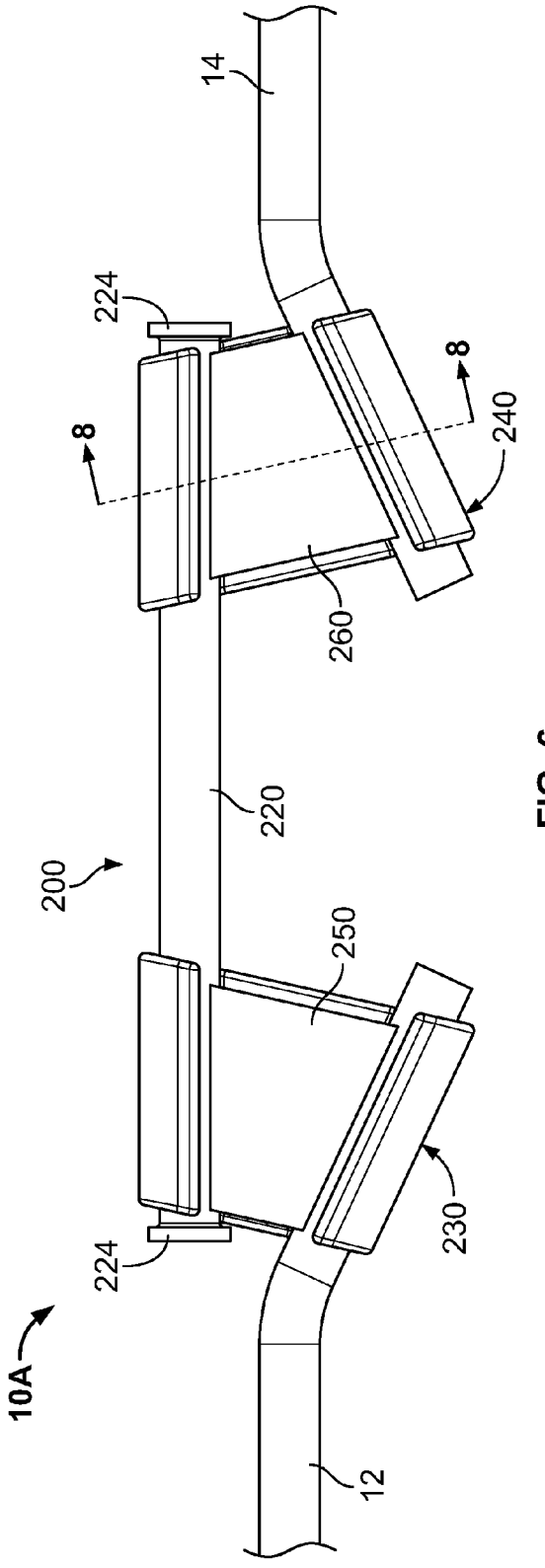


FIG. 6

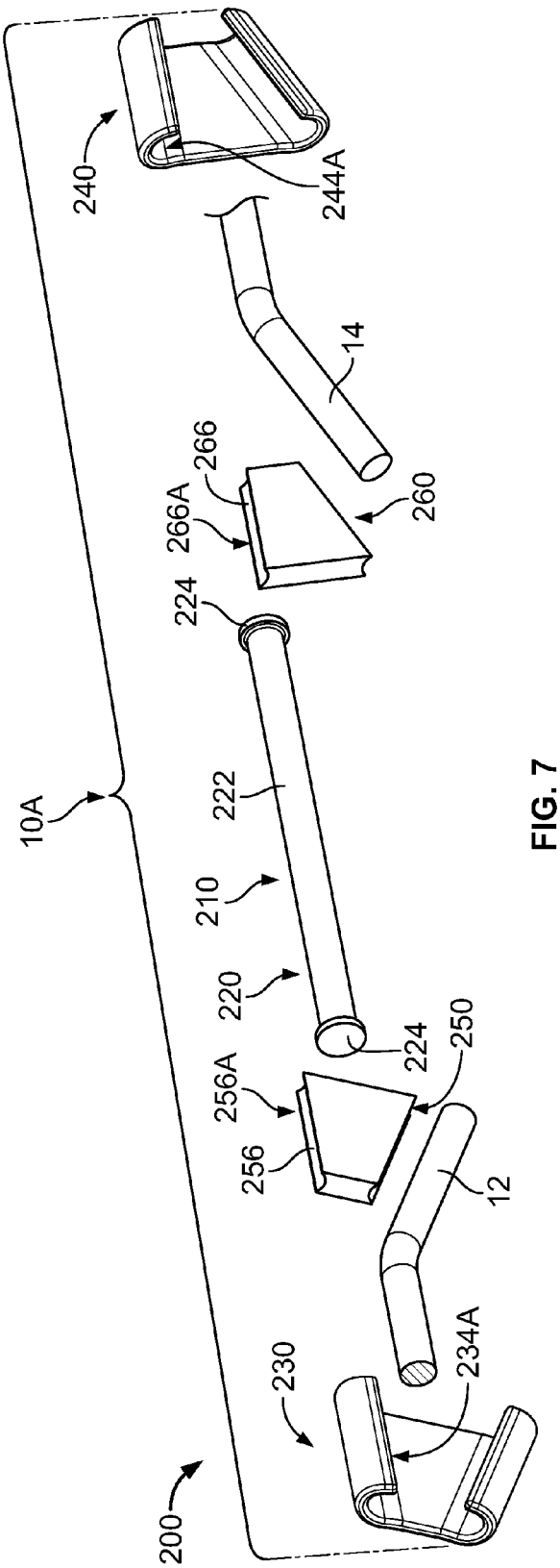
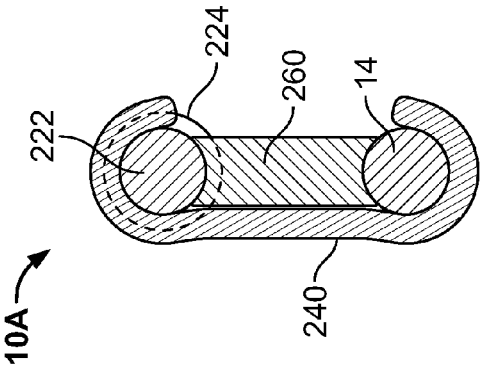

240
244A
14
260
266
266A
224
222
10A
210
220
224
250
256A
256
12
230
234A
200

FIG. 7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260
14
222
10A
240

FIG. 8

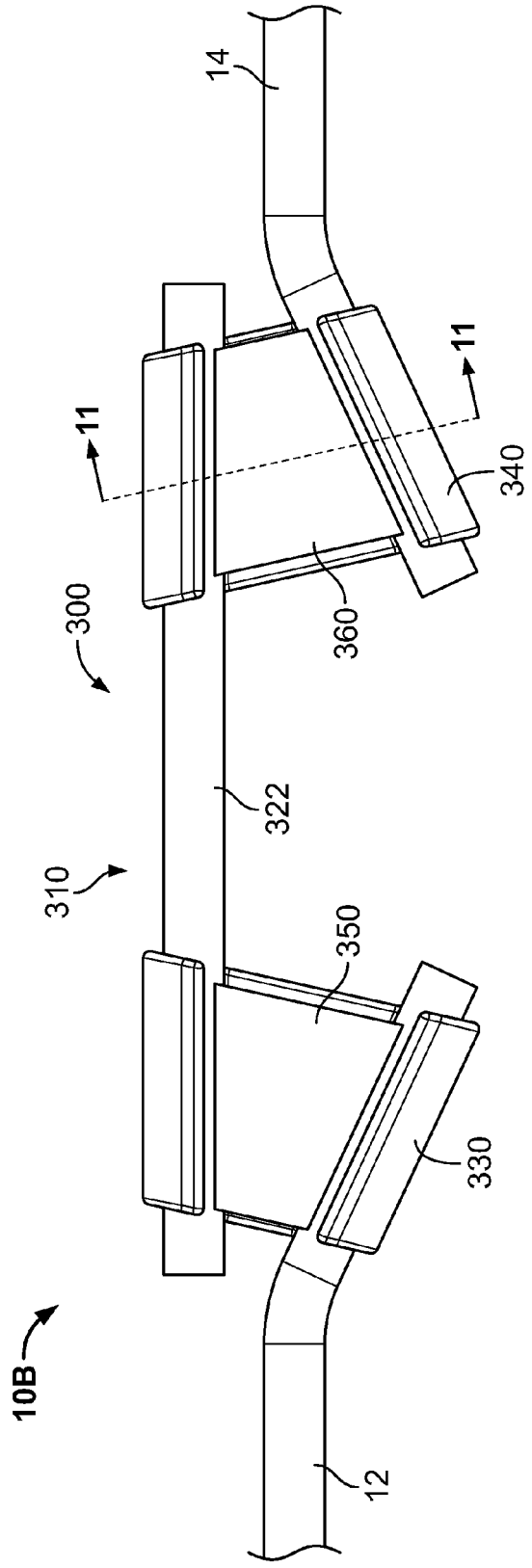

FIG. 9

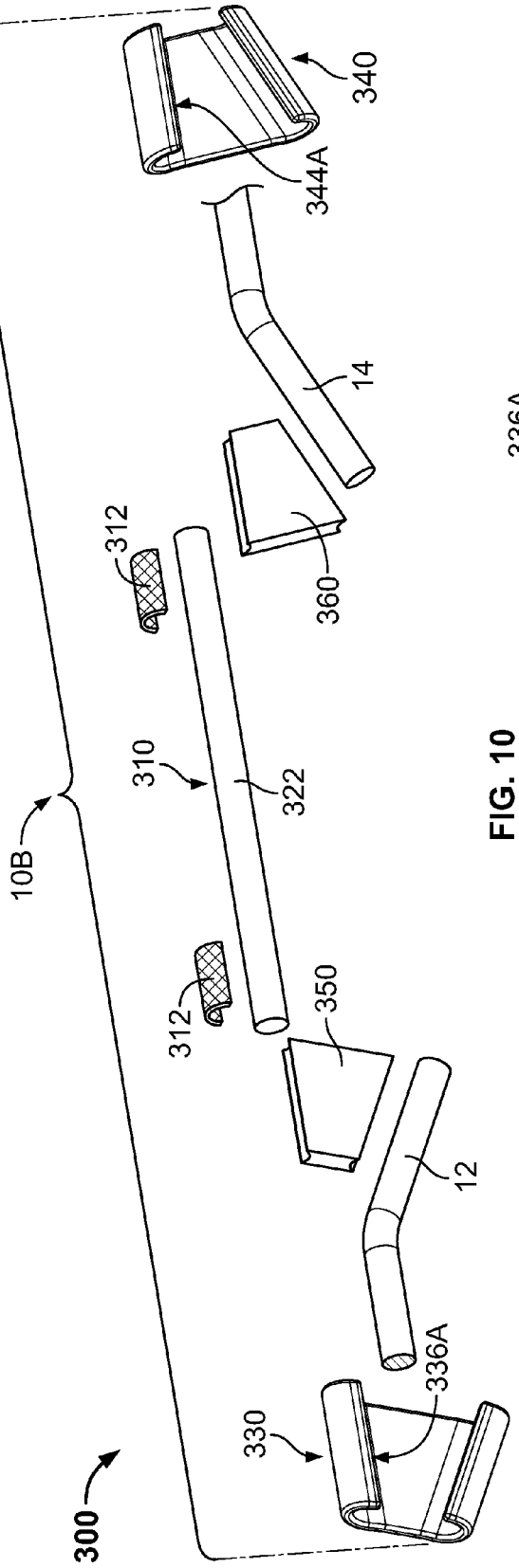
340
344A
14
360
312
310
322
10B
312
350
12
336A
330
300

FIG. 10

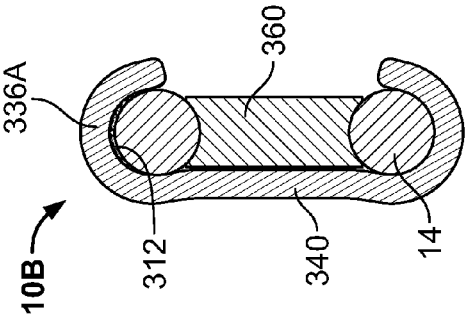
360
336A
10B
312
340
14

FIG. 11

WEDGE CONNECTOR ASSEMBLIES AND METHODS FOR CONNECTING ELECTRICAL CONDUCTORS USING SAME

RELATED APPLICATIONS(S)

The present application claims the benefit of and priority from U.S. Provisional Patent Application Ser. No. 61/736,783, filed Dec. 13, 2012, the disclosure of which is hereby incorporated herein in its entirety.

FIELD OF THE INVENTION

The present invention relates to connectors and, more particularly, to power electrical connectors and methods and connections including the same.

BACKGROUND OF THE INVENTION

Utility firms constructing, operating and maintaining overhead and/or underground power distribution networks and systems utilize connectors to join electrical cables such as high voltage electrical power distribution and transmission lines. In some cases, it is necessary or desirable to form a tension splice between two conductors (e.g., across a pre-existing connector). Automatic connectors are commonly used for this purpose, but may suffer from a number of problems relating to preparation, reliability and performance.

SUMMARY OF THE INVENTION

According to embodiments of the present invention, a wedge connector assembly for forming an electrical connection with first and second electrical conductors includes a coupling portion, first and second resilient spring sleeve portions located on the coupling portion, a first wedge member and a second wedge member. The first spring sleeve portion defines a first sleeve cavity and a first conductor channel configured to receive the first conductor. The second spring sleeve portion defines a second sleeve cavity and a second conductor channel configured to receive the second conductor. The first sleeve cavity tapers in a first direction away from the second spring sleeve portion and the second sleeve cavity tapers in a second direction away from the first spring sleeve portion. The first wedge member is configured to be forcibly driven into the first sleeve cavity in the first direction to thereby capture the first conductor in the first conductor channel between the first spring sleeve portion and the first wedge member. The second wedge member is configured to be forcibly driven into the second sleeve cavity in the second direction to thereby capture the second conductor in the second conductor channel between the second spring sleeve portion and the second wedge member.

According to method embodiments of the present invention, a method for forming an electrical connection with first and second electrical conductors includes providing a coupling portion and first and second resilient spring sleeve portions located on the coupling portion. The first spring sleeve portion defines a first sleeve cavity and a first conductor channel configured to receive the first conductor. The second spring sleeve portion defines a second sleeve cavity and a second conductor channel configured to receive the second conductor. The first sleeve cavity tapers in a first direction away from the second spring sleeve portion and the second sleeve cavity tapers in a second direction away from the first spring sleeve portion. The method further includes: mounting the first conductor in the first conductor channel; forcibly driving a first wedge member into the first sleeve cavity in the first direction and thereby capturing the first conductor in the first conductor channel between the second spring sleeve portion and the second wedge member; mounting the second conductor in the second conductor channel; and forcibly driving a second wedge member into the second sleeve cavity in the second direction and thereby capturing the second conductor in the second conductor channel between the second spring sleeve portion and the second wedge member.

According to embodiments of the present invention, an electrical connection between first and second electrical conductors includes a first electrical conductor, a second electrical conductor, and a wedge connector assembly. The wedge connector assembly includes a coupling portion, first and second resilient spring sleeve portions located on the coupling portion, a first wedge member, and a second wedge member. The first spring sleeve portion defines a first sleeve cavity and a first conductor channel, an engagement section of the first conductor being disposed in the first conductor channel. The second spring sleeve portion defines a second sleeve cavity and a second conductor channel, an engagement portion of the second conductor being disposed in the second conductor channel. The first sleeve cavity tapers in a first direction away from the second spring sleeve portion and the second sleeve cavity tapers in a second direction away from the first spring sleeve portion. The first wedge member is forcibly driven into the first sleeve cavity in the first direction and captures the first conductor in the first conductor channel between the first spring sleeve portion and the first wedge member. The second wedge member is forcibly driven into the second sleeve cavity in the second direction captures the second conductor in the second conductor channel between the second spring sleeve portion and the second wedge member.

According to embodiments of the present invention, an electrical connection between first and second electrical conductors includes first and second electrical conductors and a wedge connector assembly. The first electrical conductor has a first rated break strength and a second electrical conductor has a second rated break strength. The wedge connector assembly includes at least one resilient spring sleeve member and at least one wedge member. The at least one resilient spring sleeve member defines first and second conductor channels. The first and second conductors are disposed in the first and second conductor channels, respectively, and captured therein between the at least one resilient spring sleeve member and the at least one wedge member to form a mechanical tension splice connection between the wedge connector assembly and each of the first and second conductor. The mechanical tension splice connection has a rated pull out strength that is at least 70% of each of the first and second rated break strengths.

Further features, advantages and details of the present invention will be appreciated by those of ordinary skill in the art from a reading of the figures and the detailed description of the embodiments that follow, such description being merely illustrative of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side view of an electrical connection including a wedge connector assembly according to embodiments of the present invention.

FIG. **2** is an exploded view of the electrical connection of FIG. **1**.

FIG. **3** is a cross-sectional view of the electrical connector of FIG. **1** taken along the line **3-3** of FIG. **1**.

FIG. **4** is a cross-sectional view of the electrical connection of FIG. **1** taken along the line **4-4** of FIG. **1**.

FIG. **5** is a side view of an alternate connection wherein the connection of FIG. **1** is formed around a pre-existing connection.

FIG. **6** is a side view of an electrical connection including a wedge connector assembly according to further embodiments of the present invention.

FIG. **7** is an exploded view of the wedge connector assembly of FIG. **6**.

FIG. **8** is a cross-sectional view of the wedge connector assembly of FIG. **6** taken along the line **8-8** of FIG. **6**.

FIG. **9** is a side view of an electrical connection including a wedge connector assembly according to further embodiments of the present invention.

FIG. **10** is an exploded view of the wedge connector assembly of FIG. **9**.

FIG. **11** is a cross-sectional view of the wedge connector assembly of FIG. **9** taken along the line **11-11** of FIG. **9**.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which illustrative embodiments of the invention are shown. In the drawings, the relative sizes of regions or features may be exaggerated for clarity. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

It will be understood that, although the terms first, second, etc. may be used herein to describe various elements, components, regions, layers and/or sections, these elements, components, regions, layers and/or sections should not be limited by these terms. These terms are only used to distinguish one element, component, region, layer or section from another region, layer or section. Thus, a first element, component, region, layer or section discussed below could be termed a second element, component, region, layer or section without departing from the teachings of the present invention.

Spatially relative terms, such as "beneath", "below", "lower", "above", "upper" and the like, may be used herein for ease of description to describe one element or feature's relationship to another element(s) or feature(s) as illustrated in the figures. It will be understood that the spatially relative terms are intended to encompass different orientations of the device in use or operation in addition to the orientation depicted in the figures. For example, if the device in the figures is turned over, elements described as "below" or "beneath" other elements or features would then be oriented "above" the other elements or features. Thus, the exemplary term "below" can encompass both an orientation of above and below. The device may be otherwise oriented (rotated 90° or at other orientations) and the spatially relative descriptors used herein interpreted accordingly.

As used herein, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless expressly stated otherwise. It will be further understood that the terms "includes," "comprises," "including" and/or "comprising," when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof. It will be understood that when an element is referred to as being "connected" or "coupled" to another element, it can be directly connected or coupled to the other element or intervening elements may be present. As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items.

Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of this specification and the relevant art and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

As used herein, "monolithic" means an object that is a single, unitary piece formed or composed of a material without joints or seams.

With reference to FIGS. **1-5**, a wedge connector assembly **100** according to embodiments of the present invention is shown therein. The wedge connector assembly **100** may be used to form an electrical connection **10** between a pair of elongate electrical cables or conductors **12**, **14**. According to some embodiments, the connection **10** is a tension splice. In some embodiments, the connection **10** is formed about a preinstalled or pre-existing connection **20** (including a connector **22**) between the conductors **12**, **14**. The wedge connector assembly **100** may be installed using a tool assembly **30** (shown in dashed lines in FIG. **1**).

The conductors **12**, **14** may be any suitable electrically conductive conductors with at least engagement sections **12**A, **14**A thereof being exposed to enable electrical contact. According to some embodiments, one or both of the conductors **12**, **14** include a plurality of elongate strands. According to some embodiments, one or both of the conductors **12**, **14** are solid. According to some embodiments, the conductors **12**, **14** are flexible or bendable. The conductor **12** has a main section **12**B having a conductor axis A-A. The conductor **14** has a main section **14**B having a conductor axis B-B.

The tool assembly **30** may be any suitable tool for installing a connector assembly as described herein. According to some embodiments, the tool assembly **30** is an explosive powder actuated tool. In some embodiments, the tool assembly **30** is an electrically powered tool. The exemplary tool assembly **30** includes an anvil or tool head **32**, a drive mechanism **34** (e.g., an explosively actuated tool or an electrically powered driver), and a ram **36**. Examples of suitable tool assemblies are disclosed in U.S. Pat. No. 6,851,262 to Gregory et al.

The wedge connector assembly **100** includes a spring coupling unit **110**, a left wedge member **150**, and a right wedge member **160**. Components and features are referred to herein as "left" and "right" for the purposes of explanation only.

The spring coupling unit **110** has opposed ends **110**A and **110**B. The spring coupling unit **110** includes a coupling portion **120**, a resilient left spring sleeve portion **130**, and a resilient right spring sleeve portion **140**. According to some embodiments, the spring coupling unit **110** is unitary. According to some embodiments, the unit **110** is monolithic. In some embodiments, the unit **110** is integrally and unitarily formed. According to some embodiments, the unit **110** is rigid.

The spring coupling unit **110** may be formed of any suitable material. According to some embodiments, the unit **110** is formed of metal. In some embodiments, the unit **110** is formed of aluminum or copper. The unit **110** may be formed

in any suitable manner. According to some embodiments, the unit **110** is stamped (e.g., die cut), formed, machined and/or cast.

The coupling portion **120** has opposed ends **120**A and **120**B and an arcuate wall **122** extending from end **120**A to end **120**B. The wall **122** defines a channel **122**A. The sleeve portion **130** is integrally formed with or affixed to the end **120**A. The sleeve portion **140** is integrally formed with or affixed to the **120**B.

The spring sleeve portion **130** includes a body **132** and opposed upper and lower arcuate side walls **134** and **136** extending along the opposed side edges of the body **132**. The sleeve portion **130** defines a cavity **138** including an upper channel **134**A (defined by the side wall **134**) and an opposing lower channel **136**A (defined by the side wall **136**). The sleeve portion **130** and the cavity **138** taper inwardly in a direction T**1** from an inner end **130**A to an outer end **130**B. The direction T**1** is away from the sleeve portion **140**.

The spring sleeve portion **140** includes a body **142** and opposed upper and lower arcuate side walls **144** and **146** extending along the opposed side edges of the body **142**. The sleeve portion **140** defines a cavity **148** including an upper channel **144**A (defined by the side wall **144**) and an opposing lower channel **146**A (defined by the side wall **146**). The sleeve portion **140** and the cavity **148** taper inwardly in a direction T**2** from an inner end **140**A to an outer end **140**B. The taper direction T**2** is generally (but not necessarily directly) opposite the taper direction T**1**, and is away from the sleeve portion **130**.

The wedge member **150** includes a body **152** having opposing, arcuate side walls **154** and **156**. The upper side wall **154** is convex and the lower side wall **156** is concave and defines a groove or channel **156**A. The wedge member **150** tapers inwardly in a direction from an inner end **150**A to an outer end **150**B.

The wedge member **160** includes a body **162** having opposing, arcuate side walls **164** and **166**. The upper side wall **164** is convex and the lower side wall **166** is concave and defines a groove or channel **166**A. The wedge member **160** tapers inwardly in a direction from an inner end **160**A to an outer end **160**B.

The wedge members **150**, **160** may be formed of any suitable material and using any suitable technique. According to some embodiments, the wedge members **150**, **160** are formed of metal and, in some embodiments, aluminum or copper. According to some embodiments, the wedge members **150**, **160** are cast and/or machined.

With reference to FIG. **1**, the spring coupling unit **110** and the channel **122**A thereof each define a unit axis D-D. The channel **134**A defines an axis E-E, the channel **144**A defines an axis F-F, the channel **136**A defines an axis G-G, and the channel **146**A defines an axis H-H. With references to FIG. **2**, the wedge side wall **154** defines an axis J-J, the wedge groove **156**A defines an axis K-K, the wedge side wall **164** defines an axis L-L, and the wedge groove **166**A defines an axis M-M.

The axes J-J and K-K form an oblique included angle therebetween, and the axes L-L and M-M likewise form an oblique included angle therebetween. According to some embodiments, these oblique included angles are in the range of from about 160 to 175 degrees and, in some embodiments, from 167 to 171 degrees.

The wedge connector assembly **100** may be used as follows in accordance with the embodiments of the present invention. The conductor section **12**A is placed in the channel **134**A with the conductor section **12**B extending away from the end **110**A of the spring coupling unit **110**. The wedge member **150** is partially installed in the cavity **138** with the outer end **150**B facing the outer end **130**B, the upper side wall **154** received in the channel **134**A and the channel **156**A receiving the conductor section **12**A. The wedge member **150** may be forced into the sleeve portion **130** by hand or using a hammer or the like to temporarily hold the wedge member **150** and the conductor section **12**A in position.

The tool head **32** of the tool assembly **30** is mounted on the wedge connector assembly **100** as shown in FIG. **1** in dashed lines. The angled orientation of the wedge member **150** with respect to the coupling portion **120** can provide space or clearance for mounting and/or operating the tool assembly **30**. The drive mechanism **34** is actuated (e.g., fired or powered) to drive the ram **36** into the wedge member **150**. The wedge member **150** is thereby forcibly driven outwardly in a forward direction P (generally the same as the cavity taper direction T**1** and away from the sleeve portion **140**) relative to the sleeve portion **130** to a final position as shown in FIG. **1** to capture the conductor section **12**A between the side wall **156** and the side wall **136**. Interference fits are formed between the conductor section **12**A and the engaging surfaces of the walls **156**, **136** and between the wedge side wall **154** and the side wall **134**. The conductor **12** is thereby mechanically and electrically connected to the wedge connector assembly **100**. The wedge member **150**, the sleeve portion **130** and/or the conductor section **12**A may be deformed. According to some embodiments, the sleeve portion **130** is elastically deformed so that the side walls **134**, **136** are deflected or displaced in divergent outward directions R (FIG. **1**) and apply a persistent bias or spring force against the wedge member **150** and the conductor section **12**A.

The conductor engagement section **14**A is then mounted in the channel **146**. The wedge member **160** is installed in the sleeve portion **140** (in the same manner as described above for the wedge member **150**) to capture the conductor section **14**A and mechanically and electrically connect the conductor **14** to the wedge connector assembly **100**, and to thereby mechanically and electrically connect the conductors **12** and **14** to one another. More particularly, the wedge member **160** is forcibly driven outwardly using the tool assembly **30** in a forward direction Q (generally the same as the cavity taper direction T**2**) relative to the sleeve portion **140** to a final position as shown in FIG. **1**. The direction Q is away from the sleeve portion **130** and opposite the direction P.

According to some embodiments, the connection **10** is a tension splice wherein the conductors **12** and **14** exert opposing pulling loads on the wedge connector assembly **100** that place the wedge connector assembly **100** in tension. According to some embodiments, the connection **10** is a straight or in-line tension splice (e.g., a main run butt splice). The wedge connector assembly **100** can be installed and the connection **10** can extend or be formed around an existing connector **22** as shown in FIG. **5**. The existing connector **22** can instead be cut out before or after installing the wedge connector assembly **100**. The conductors **12**, **14** can be in tension during the steps of installing the wedge members **150**, **160** to capture the conductor sections **12**A, **14**A. According to some embodiments, the wedge connector assembly **100** can be used to take up length of a single conductor to thereby reduce sag in the conductor.

The configuration of the wedge connector assembly **100** can provide the connection **10** with a high pullout strength, enabling the connection **10** to withstand high tension loads on the conductors **12** and **14** without the conductor sections **12**A and **14**A being pulled out from the sleeve portions **130** and **140**. Because the sleeve portion **130** and the wedge member **150** are tapered in the direction of the tension load of the conductor **12**, the pullout force from the conductor **12** tends to

pull the wedge member **150** in the direction P and thereby into a tighter engagement with the sleeve portion **130** and the conductor section **12**A. Likewise, because the sleeve portion **140** and the wedge member **160** are tapered in the direction of the tension load of the conductor **14**, the pullout force from the conductor **14** tends to pull the wedge member **160** in the direction Q and thereby into tighter engagement with the sleeve portion **140** and the conductor section **14**A.

As can be seen in FIG. **1**, with the conductors **12**, **14** in tension, a bend **12**C, **14**C is formed between each conductor main section **12**B, **14**B and the corresponding conductor engagement section **12**A, **14**A. The wedge connector assembly **100** is configured such that, when the conductors **12**, **14** are in tension sufficient to place their axes A-A and B-B in near or substantially parallel alignment, an angle U is defined between the conductor axis A-A and the channel axis G-G (which is generally the same as the axis of the conductor section **12**A) and an angle V is defined between the conductor axis B-B and the channel axis H-H (which is generally the same as the axis of the conductor section **14**A). According to some embodiments, each angle U, V is at least 160 degrees and, in some embodiments, in the range of from about 167 to 171 degrees. In this manner, the pullout strengths of the connections are increased. According to some embodiments, the outer edges of the sleeve sections **130**, **140** are rounded to reduce the risk of strand breakage in or damage to the conductors **12**, **14**.

With reference to FIGS. **6-8**, a connection **10**A including a wedge connector assembly **200** according to further embodiments of the present invention is shown therein. The wedge connector assembly **200** includes a spring coupling assembly **210**, a wedge member **250** and a wedge member **260**.

The spring coupling assembly **210** includes a coupling member or rod **220**, a spring sleeve member **230** and a spring sleeve member **240**. The rod **220** includes a rigid rod body **222** and opposed stop features **224** on each end of the rod body **222**.

The spring sleeve members **230** and **240** generally correspond to the sleeve portions **130** and **140** except that the sleeve members **230** and **240** are not affixed to a common coupling portion. Instead, these sleeve members **230** and **240** are mounted on opposed ends of the rod body **222** such that the rod body **222** is received in upper channels **234**A and **244**A. In some embodiments, the rod body **222** is slidable in the channels **234**A, **244**A until the wedge members **250**, **260** are secured.

The wedge members **250**, **260** generally correspond to the wedge members **150**, **160** except that the upper convex walls **154**, **164** are replaced with concave walls **256**, **266** defining channels **256**A, **266**A that receive the rod body **222**.

The wedge connector assembly **200** can be installed on the conductors **12**, **14** in the same manner as described above for the wedge connector assembly **100** to form the connection **10**A. However, in the case of the connection **10**A, the stop features **224** will limit outward travel of the spring sleeve members **230**, **240**.

With reference to FIGS. **9-11**, a connection **10**B including a wedge connector assembly **300** according to further embodiments of the invention is shown therein. The wedge connector assembly **300** includes a spring coupling assembly **310**, a wedge member **350** and a wedge member **360**. The spring coupling assembly **310**, the wedge member **350** and the wedge member **360** are configured in the same manner as the spring coupling assembly **210**, the wedge member **250** and the wedge member **260**, except that the stop features **224** are omitted and the rod body **322** is affixed to the inner surfaces of the spring member channels **334**A, **344**A of the spring sleeve members **330** and **340** by welds **312**. In the case of the connection **10**B, the welds **312** will prevent outward travel of the spring sleeve members **330** and **340**.

According to some embodiments, a mechanical tension splice connection formed using a wedge connection assembly according to embodiments of the present invention (e.g., the wedge connector assembly **100**, **200** or **300**) has a rated pullout strength that is at least 70 percent of the rated break strength of each of the conductors **12** and **14**.

According to further embodiments, the spring sleeve portions or members can be affixed to a coupling portion or member by other techniques (e.g., bolted together). In some embodiments, the coupling portion is an electrically conductive, flexible wire or cable.

Embodiments of the present invention have been described above and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation. The following claims are provided to ensure that the present application meets all statutory requirements as a priority application in all jurisdictions and shall not be construed as setting forth the scope of the present invention.

That which is claimed is:

1. A wedge connector assembly for forming an electrical connection with first and second electrical conductors, the wedge connector assembly comprising:

a coupling portion;

first and second resilient spring sleeve portions located on the coupling portion, wherein:

the first spring sleeve portion defines a first sleeve cavity and a first conductor channel configured to receive the first conductor;

the second spring sleeve portion defines a second sleeve cavity and a second conductor channel configured to receive the second conductor; and

the first sleeve cavity tapers in a first direction away from the second spring sleeve portion and the second sleeve cavity tapers in a second direction away from the first spring sleeve portion;

a first wedge member configured to be forcibly driven into the first sleeve cavity in the first direction to thereby capture the first conductor in the first conductor channel between the first spring sleeve portion and the first wedge member; and

a second wedge member configured to be forcibly driven into the second sleeve cavity in the second direction to thereby capture the second conductor in the second conductor channel between the second spring sleeve portion and the second wedge member.

2. The wedge connector assembly of claim **1** wherein:

the coupling portion has first and second opposed ends; and

the first and second spring sleeve portions are located on the first and second ends of the coupling portion, respectively.

3. The wedge connector assembly of claim **1** wherein the first and second spring sleeve portions are integrally formed with the coupling member.

4. The wedge connector assembly of claim **1** wherein:

the coupling portion includes a rod having first and second opposed end portions and first and second stop features on the first and second ends, respectively;

the first spring sleeve portion includes a first sleeve member slidably mounted on the rod adjacent the first end thereof; and

the second spring sleeve portion includes a second sleeve member slidably mounted on the rod adjacent the second end thereof;

wherein the first and second stop features limit movement of the first and second sleeve members.

5. The wedge connector assembly of claim **1** wherein:

the coupling portion includes a rod having first and second opposed end portions; and

the first and second end portions are welded to the first and second spring sleeve portions, respectively.

6. The wedge connector assembly of claim **1** wherein the coupling portion includes a flexible electrical conductive coupling member.

7. The wedge connector assembly of claim **1** wherein the first and second directions are opposite one another.

8. A method for forming an electrical connection with first and second electrical conductors, the method comprising:

providing a coupling portion and first and second resilient spring sleeve portions located on the coupling portion, wherein:

the first spring sleeve portion defines a first sleeve cavity and a first conductor channel configured to receive the first conductor;

the second spring sleeve portion defines a second sleeve cavity and a second conductor channel configured to receive the second conductor; and

the first sleeve cavity tapers in a first direction away from the second spring sleeve portion and the second sleeve cavity tapers in a second direction away from the first spring sleeve portion;

mounting the first conductor in the first conductor channel;

forcibly driving a first wedge member into the first sleeve cavity in the first direction and thereby capturing the first conductor in the first conductor channel between the second spring sleeve portion and the second wedge member;

mounting the second conductor in the second conductor channel; and

forcibly driving a second wedge member into the second sleeve cavity in the second direction and thereby capturing the second conductor in the second conductor channel between the second spring sleeve portion and the second wedge member.

9. The method of claim **8** wherein forcibly driving the first wedge member into the first sleeve cavity includes forcibly driving the first wedge member into the first sleeve cavity using a tool.

10. The method of claim **9** wherein the tool is an explosive powder actuated tool.

11. The method of claim **8** wherein:

the first and second conductors are connected by a pre-installed connector; and

the method includes capturing the first and second conductors in the first and second conductor channels, respectively, without disconnecting the first and second conductors from the pre-installed connector.

12. The method of claim **8** wherein the electrical connection is a tension splice between the first and second conductors.

13. The method of claim **12** wherein:

the first electrical conductor having a first rated break strength and a second electrical conductor having a second rated break strength; and

the mechanical tension splice connection has a rated pull out strength that is at least 70% of each of the first and second rated break strengths.

14. The method of claim **8** wherein the first and second directions are opposite one another.

15. The method of claim **8** wherein:

the coupling portion has first and second opposed ends; and

the first and second spring sleeve portions are located on the first and second ends of the coupling portion, respectively.

16. The method of claim **8** wherein the first and second spring sleeve portions are integrally formed with the coupling member.

17. The method of claim **8** wherein:

the coupling portion includes a rod having first and second opposed end portions and first and second stop features on the first and second ends, respectively;

the first spring sleeve portion includes a first sleeve member slidably mounted on the rod adjacent the first end thereof; and

the second spring sleeve portion includes a second sleeve member slidably mounted on the rod adjacent the second end thereof;

wherein the first and second stop features limit movement of the first and second sleeve members.

18. The method of claim **8** wherein:

the coupling portion includes a rod having first and second opposed end portions; and

the first and second end portions are welded to the first and second spring sleeve portions, respectively.

19. The method of claim **8** wherein the coupling portion includes a flexible electrical conductive coupling member.

20. The method of claim **8** wherein the first and second directions are opposite one another.

21. An electrical connection between first and second electrical conductors, the electrical connection comprising:

a first electrical conductor and a second electrical conductor;

a wedge connector assembly including:

a coupling portion;

first and second resilient spring sleeve portions located on the coupling portion, wherein:

the first spring sleeve portion defines a first sleeve cavity and a first conductor channel, an engagement section of the first conductor being disposed in the first conductor channel;

the second spring sleeve portion defines a second sleeve cavity and a second conductor channel, an engagement portion of the second conductor being disposed in the second conductor channel; and

the first sleeve cavity tapers in a first direction away from the second spring sleeve portion and the second sleeve cavity tapers in a second direction away from the first spring sleeve portion;

a first wedge member forcibly driven into the first sleeve cavity in the first direction and capturing the first conductor in the first conductor channel between the first spring sleeve portion and the first wedge member; and

a second wedge member forcibly driven into the second sleeve cavity in the second direction capturing the second conductor in the second conductor channel between the second spring sleeve portion and the second wedge member.

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